Using Agile Collaborative Contracting Principles for Home Improvement Projects

Introduction

In the Summer of 2017 a new, unforeseen market requirement emerged. Several families decided to converge upon our old house in the late Summer all at one time. Normally, all that would have been required would have been to clean our house thoroughly, as we usually do under such circumstances. However, a key business owner or stakeholder decided to add more scope and complexity to this emerging market requirement, by chartering a new, fairly-large, last-minute Epic-MVP business initiative (i.e., home improvement project). In this case, we were to modernize the kitchen as well as the master bathroom, which is probably two (2) MVPs or Business Features, not one. This is the story of the master bathroom MVP initiative and how I applied Agile and Scrum Collaborative Contracting principles to facilitate completion of the master bathroom project. This, of course, is not to say, the kitchen project was not an Epic MVP, but that's a story for another day (as this Scrummaster is no stranger to miracles)!

Backlog Grooming

Well, obviously, the first step was to begin scoping this project and develop a vision or elevator speech. After a few quick (informal) conversations with the chief business (home) owner (my spouse), I crafted the following statement, "Completely modernize and renovate the master bathroom on a shoestring budget by end of July 2017!" I don't know what it's like in your home and family, but when our chief business owner speaks, people listen (like E. F. Hutton or Alan Greenspan)! Through a family acquaintance, we quickly located a trusted home improvement specialist (carpenter). We made contact, scheduled an in-home appointment to survey the job site (master bathroom) and do some high-level scoping, planning, and estimating. That is, mentally record a Minimum Viable Product (MVP), also called a Lean or Business Canvass, but simpler. The chief business owner clearly laid out three (3) main Business Features or Product Backlog Items (new custom tiled shower, tiled floor, and double vanity). The builder gave us an estimate for the MVP, which was about 20% of the market price, asked us to procure the materials we wished to use in-advance, and said that he and his home improvement (development) team of five people would require 11 calendar days to complete the project. They were to work part-time on evenings and weekends, since they each had full-time day jobs. We agreed verbally to the terms and conditions (i.e., MVP or Product Backlog, price, duration, buyer-supplied materials, near-term start date, and verbal warranty concerning any necessary repairs due to poor workmanship).

Sprint Zero

The chief business owner immediately began scanning local stores and the Internet for the desired supplies. Floor and shower tiles were found in the local home improvement store at reasonable price and procured. A quick search of the Internet yielded a store only a few hours away with vanities and other bathroom supplies. We made a quick road trip to the nearby city, toured the showroom, selected a double dark cherry vanity with a granite top and associated fixtures, suspended glass shower doors, and an elaborate stainless-steel shower panel (with multiple shower jets). All materials were top-of-the-line and reasonably-priced from a small bathroom wholesaler. Since the materials were too large to fit in our largest SUV, we had to make arrangements for the materials to be delivered at a reasonable price. The oversized materials were delivered within a few days and placed in our garage until construction was to begin. We notified the builder, agreed to a construction start date, and cleared the master bathroom of any personal effects and items. At this point, Sprint Zero was complete. While this seems like an innocuous, simple, and harmless Sprint, this was a critical success factor to this project's success (and should not be underestimated or ignored).

Sprint Interlude

The Assistant Business Owner (myself) assumed the role of (Proxy) Product Owner of the Product Backlog, since the job of the Chief Business Owner was complete, which was to scope the MVP, agree upon a price and timeline, and identify, select, and procure the materials of her choice. Our master bedroom served as my home office, which I occupied most evenings, so I also served as the Scrummaster of this home improvement project as well (by default). That is, my central role as Scrummaster was to quickly identify any impediments and personally remove them in real-time. My training, certification, research, and experience in Scrummastering was invaluable to the success of this home improvement project. At the project onset, the complete scope of the MVP (master bedroom renovation) was not known in advance (i.e., presence of some uncertainty and risk). Uncertainty is the reason MVPs are created, to gradually tease out uncertainty with progressive elaboration or iterative development. While the risk impact of this MVP was not severe or costly, there was a lot of low-level risk involved as the detailed design requirements emerged in an incremental and evolutionary fashion. Remember, the Development Team was only part-time, held full-time day jobs, came in on evenings after working 12-hour days seven days a week, and were mentally and physically exhausted. The slightest impediment, real or perceived would have been an immediate red flag, signaled a mental stoppage in work for an indefinite period-of-time, and indicate it was time to go home and rest.

As Scrummaster, I ensured the Product Backlog was properly ordered, groomed, and understood, Sprint Planning was conducted and Sprint Goals were established, User Stories were assigned to each Sprint, Daily Standup or Scrum Meetings were applied, Impediments (Blockers) were quickly identified and removed, Sprint Demonstrations or Reviews were conducted, Sprint Retrospectives were performed and process improvements were acted upon, and commitments were made and enforced as much as possible. I regularly observed, interacted with, coached, and even participated with the Development Team throughout each day of each iteration. This way I could identify any emerging impediments in real-time, encourage the team to continue

moving at maximum velocity, personally remove any impediments quickly, and even lend a helping hand when and where necessary (as Servant Leader). Our verbal contract terms and conditions did not specify a particular process paradigm, such as Traditional, Lean, or Agile, but the (Agile) Scrum model immediately leapt out as the proper process model in which to apply. Remember, Scrum emerged from practical real-world empirical trial and error, and is not a textbook academic method. Application of the (Agile) Scrum method, willingness to be an (invisible) helping hand and Servant Leader, and Agile coaching and facilitation was the secret sauce to the success of this MVP (or utter failure if Agile principles were not applied).

Sprint (One) Planning.

At the beginning of each Sprint, I, as Scrummaster facilitated a Sprint Planning session to review the Product Backlog, identify the highest priority Product Backlog Items, and facilitate their decomposition into User Stories. This included some sizing of complexity and duration for each User Story to determine velocity and establish a Sprint Goal. The User Stories for Sprint One consisted of Strip Down Master Bathroom, Reframe Shower Stall, Install Initial Ceramic Board, Reconfigure Shower Plumbing, Complete Ceramic Board Installation, Install Shower Wall Tiles, and Install Floor Tiling. Capacity was set to 70% to allow for schedule risk, scope change, and emergent requirements. The Sprint One Goal was "Install New Tiling Throughout Master Bathroom!"

Sprint One

True to its name, Sprint One started off quickly, at a hare's pace. The Development Team Lead dispatched the primary builder to the work site to begin construction. In reality, he did much of the heavy lifting throughout the first and remaining Sprints. He arrived, backed his truck into the driveway, and laid down some protective coverings on the stairwell and floors. The master bedroom was on the second level of this two-story house. He immediately began to single-handedly strip out the bathroom vanity, remove the toilet, and remove the old shower fixtures, doors, and tiles. As Scrummaster, I held daily standups to check on the progress of the construction asking typical questions like, what did you do yesterday, what are you going to do today, and do you have any impediments? I observed and interacted with the team, lent a helping hand, and checked on their progress in 30 to 60-minute intervals (especially if there was a stoppage in work). I verbally asked the individual Development Team members how things were going, if they needed anything, or if anything was blocking their progress? I encouraged them to continue working at maximum velocity, while I sprang into action to remove impediments, such as rush to the home improvement store multiple times per day to buy missing, needed supplies throughout the project. I helped haul heavy materials up and down the stairs and I cleaned up the work site after each day, prompted the team members for next steps, secured commitments for the next day's arrival and User Stories, and, thus, maintained a healthy, productive verbal contract each and every day. On day two, the primary builder reframed the shower and installed the ceramic board. One the third day, the rest of the Development Team came into inspect and pre-assemble the elaborate shower panel to scope the size of the Reconfigure Shower Plumbing User Story and complete it. As Scrummaster (Servant Leader), I heavily participated in this User Story as well. There was no work on the fourth day (Saturday). On the fifth day, the primary builder finished the Complete Ceramic Board Installation and Install Shower Wall Tiles User Stories (which took all day Sunday). On the sixth day, the primary builder completed the Install Floor Tiling User Story. As Proxy Product Owner, I assigned two new User Stories to the Product Backlog at the urging of the Development Team. These were Install New Toilet and Install New Light Fixtures. The Development Team did not work on the last day of the Sprint, but as Scrummaster (Servant Leader) and Proxy Development Team Member (along with the Chief Business Owner) we made a trip to the local home improvement store, shopped around, purchased a new toilet and light fixtures to prepare for the new User Stories. I facilitated the Sprint One Demonstration or Review with the Chief Business Owner (who accepted all User Stories). I also facilitated the Sprint One Retrospective with a lot of new insights into how to improve this project, most of which have already been cited (participate, collaborate, share risk, communicate, converse, identify and remove impediments in real-time, keep the project moving forward, obtain date and time commitments, and keep the Velocity moving forward to prevent the project from stopping). Sprint One was full of highs and lows, it started out hard and fast, a ton of early progress was made, and there was a lot of dirt and debris everywhere. However, the Development Team, along with the Proxy Product Owner and Scrummaster (me) made a lot of progress. However, it sort of slowed down by mid-week and ended with a whimper rather than a bang. It was a highly-productive Sprint from the standpoint of Business Value and Customer Satisfaction, but it was tiring and exhausting for everyone (especially the Development Team). As a Scrummaster, I can be a bit of a hard driving task master (some people call me a hard-nurturer). I don't think the Development Team knew what hit them when they signed on to work for this Scrummaster. Quite frankly, as Proxy Business Owner, I didn't think the project would progress this quickly, nor did I realize how exhausting equal Agile collaboration, participation, and risk sharing would be. Agile methods are clearly not for lazy buyers or suppliers, in spite of their reputation as the easy way of doing things. In non-Agile paradigms, everyone wants to give orders, walk away, return, and have everything complete on-time, on-schedule, and on-scope (or refuse payment for services). However, experience has shown that this model doesn't work more than 70% of the time, whereas the Agile model has a 70% success rate.

- **Wed** - (Beginning of Work) Stripped down.
- **Thu** - Reframe shower & ceramic board (initial).
- **Fri** - Shower plumbing.
- **Sat** - (No work).
- **Sun** - Ceramic board (completion) & shower tiling.
- **Mon** - Floor tiling.
- **Tue** - (No Work, Us) Purchased toilets & light fixtures.

Sprint (Two) Planning.

With Sprint One, its Demonstration, and its Retrospective behind us, I facilitated the Sprint Two Planning session to review the Product Backlog, identify the highest priority Product Backlog Items, and facilitate their decomposition into User Stories. Sprint One was sort of the Architectural Runway or Enabler Feature for the subsequent two Sprints containing User Stories of immensely higher value. Perhaps, that is why Sprint One was sort of a buzz killer. That is, it required a lot of work, energy, and heavy-lifting to get this old heap moving from Zero to Sixty in only one Sprint. It takes a lot of energy to launch a satellite into orbit, but once it's there, it doesn't take much energy for the satellite to orbit the Earth at 18,000 miles per hour. Perhaps, we were in orbit now (maybe). The User Stories for Sprint Two consisted of Install Shower Floor Sacrete, Grout Tile, Assemble Vanity, Remove Dry Board, Install New Vanity Plumbing, Install Shower Floor Tile, Configure Vanity, Install Vanity, Install Vanity Top, Install Vanity Fixtures, Grout Floor and Wall Tiles, Seal All Tiles, Paint Walls, Reseal All Tiles, Grout Shower Floor Tiles, Configure Shower Door, Install Vanity Plumbing Hookups, Remove Old Medicine Cabinet, and Paint Ceiling. Capacity was set to 100% as schedule risk, scope change, and emergent requirements were now less likely. The Sprint Two Goal was "Install New Shower Floor and Vanity!"

Sprint Two

Although Sprint Two had almost three times more User Stories with greater Business Value than Sprint One, it almost seemed to move slower as things bogged down a bit. This was probably more perception than reality, as Sprint One was more intriguing because it was a NEW project, there was a lot of excitement, shock, and awe, expectations were high, and, of course the old bathroom was stripped away in only a few hours. I guess it's a mistake to underestimate the Business Value of this initial User Story Enabler. That is, strip away the old design foundation to make way for the new Architectural Runway! And, as mentioned before, I think everyone was a little mentally drained during Sprint Two, because Sprint One took so much energy to launch this project into orbit. Furthermore, I think (hard) reality hit everyone like a ton of bricks that this was NOT going to be an EASY project! Furthermore, the application of participatory or collaborative, risk sharing Agile (contracting) models like Scrum was not going to be a pleasant experience for anyone (neither buyer nor supplier). In other words, both the buyer and supplier were going to have to do a lot of heavy lifting to move this project from the realm of 70% project failure to 70% project success! Once again, the primary builder showed up on Wednesday evening to complete the tile grouting on the shower walls and pour the sacrete into the new shower floor basin. This took a long time, setting the tone for the rest of the Sprint. Although, once again, this was a high-value adding User Story Enabler, it just didn't have the shock-and-awe of a shiny new vanity (yet). On day two of Sprint Two, the full Development Team arrived, with four or five full-grown men jammed into the master bathroom at one time, including the Scrummaster. It takes a village to lift a heavy rock (or rocket) sometimes. The primary builder stripped away the drywall behind the old vanity to expose the wall and install the plumbing for the new double vanity. Meanwhile, the rest of the Development Team (and Scrummaster) unboxed and assembled the new vanity, carried it upstairs, and put it in place to continue sizing this User Story. With that done, the Development team could now begin the process of extending the old water lines across the wall for the double vanity. On day three the primary builder installed the tiles on the new shower floor basin, installed and fastened the new vanity to the wall, installed the new granite vanity top and vanity fixtures, and grouted and sealed the shower floor tiles. Now, things were starting to pick up a bit, with high-value adding and highly-visible User Stories being complete. Again, not that the less visible User Stories of establishing the Architectural Runway had no value. While the Development Team did not show up for work on the fifth day, there was no time to rest. The Chief Business Owner could now see the light at the end of the tunnel and decided to chip in as a Servant Leader and Proxy Development Team member, shopped for new paint, and then painted the bathroom walls herself (on a moment's notice). As (Chief) Servant Leader, I resealed all of the tiles in the shower and the floor. On the sixth day, the primary developer completed the shower floor grouting, completed the plumbing hookups inside the new vanity, installed the new light fixtures, and attempted to install the shower door (discovering some hidden complexity). As Proxy Product Owner, I assigned one New User Story to the Product Backlog at the urging of the Development Team. This was Remove the Old Unsightly Medicine Cabinet (to be completed in this Sprint). The Development Team did not show up on the seventh day, but I, as the Servant Leader completed the new User Story myself. I removed the old medicine cabinet, reframed the hole, covered it with dry wall, and spackled it with joint compound, while the Chief Business Owner repainted the ceiling. I facilitated the Sprint Two Demonstration or Review with the Chief Business Owner (who accepted all User Stories). I also facilitated the Sprint One Retrospective, which like the first retrospective meant taking on more of the burden to be a Servant Leader along with involving the Business Owner as a Servant Leader as well to proactively remove impediments as they arose (if she wanted her MVP completed on time and to her satisfaction). In the end, I have to admit that Business Owner Servant Leadership may have been the tipping point which move this project's needle into the success column.

- **Wed** - (All) tile grouting & shower floor (sacrete).
- **Thu** - Vanity assembly (2), dry board removal, & plumbing.
- **Fri** - Shower floor tiling, vanity cutting & placement.
- **Sat** - Vanity install, vanity top, fixtures, grout, sealing.
- **Sun** - (No Work, Us) Painting, resealing, closet repair.
- **Mon** - Shower floor grouting, shower door start, vanity plumbing.
- **Tue** - (No Work, Us) Medicine cabinet removal & covering, Ceiling painting.

Sprint (Three) Planning.

With Sprint One and Two, their Demonstrations, and Retrospectives behind us, I facilitated the Sprint Three Planning session to review the Product Backlog, identify the highest priority Product Backlog Items, and facilitate their decomposition into User Stories. Sprint Two continued the completion of the Architectural Runway or Enabler Features for the last and final Sprint containing the User Stories with the greatest perceived Business Value. With most of the heavy lifting behind the Scrum and Development Teams, Sprint Three was sure to be the downhill or easy part of the project. However, there was still a little bit of uncertainty as to the commitment, energy, and stamina of the development team. As Proxy Business Owner and Product Owner, as well as hard-driving or hard-nurturing Scrummaster, Servant Leader, and Proxy Development Team member, the Development Team was burning out quickly. As Sir Isaac Newton said in his Third Law, "Every action has an equal and opposite reaction!" and I think I was building up some (emotional or psychological) technical debt in the heart, mind, body, and soul of the Development Team (in the form of resentment). Perhaps it was a communication or cultural barrier in the (verbal) contract terms and conditions. In their minds, they may have agreed to work at a snail's pace part-time for cut-rate price on evenings and weekends (whenever convenient). While (as buyer) we accepted those terms, we sort of took their (poor) initial engineering estimate of 11 days as a hard commitment, milestone, or go-live date! There's an old adage that project managers should immediately double an engineer's estimate and certainly not turn uncertain estimates into deadlines or milestones! Perhaps, that was our mistake as buyers. Construction projects are hard labor, especially when the Development Team is matrixed out to multiple projects. The Development Team members had to drive one or two hours each way to their primary job sites, drive to our house, work all evening, have a Scrummaster hovering over them like a helicopter, and then drive home on an empty stomach. They were probably annoyed to no end. None-the-less, we could see the light at the end of the tunnel, even if we perceived some waning energy, motivation, stamina, and commitment on behalf of the Development Team. The User Stories for Sprint Three consisted of Clean and Seal All Tile, Install New Faucets, Install New Toilet, Install New Backsplash, Install New Shower Door, Operationalize Vanity Faucets, Install Shower Panel, Reinstall Mirror, Finish Wall Over Old Medicine Cabinet, Install Shower Caddy, Install Vanity Handles, Install Other Bathroom Hardware, Cleanup Worksite, Cleanup Master Bedroom.

Sprint Three

There were almost as many User Stories in the third and final Sprint as there were in Sprint Two. However, at this point, the Velocity was peaking, so the User Stories had more complexity in terms of Story Points. That is, the Stories weren't Split as finely as they had been in Sprint Two. Some User Stories had two or three times the complexity as their predecessors. This was especially true of operationalizing the vanity, certainly installing the complex new hanging or suspended glass shower door, installing the elaborate shower panel, and, of course, completing the final, finishing touches to operationalize the new renovated master bathroom MVP itself. The Development Team did not work on day one or two of Sprint Three. In fact, they did not show up for the last day of Sprint Two or the first two days of Sprint Three, for a total of three consecutive days of no Development Team work. This seemed like an eternity to the buyers (Business Owner, Product Owner, and Scrummaster), who were anxious to complete this MVP and prepare for the Parousia of their Summer guests (go live date!). Again, was this passive-aggressive stonewalling by the Development Team who did not appreciate the relentless drive of the Scrummaster, were their full-time day jobs suffering from lack of commitment or split loyalties, did they feel they were ahead of schedule and thus deserved some slack in the schedule, were they simply burnt out, or all of the above? On day two of Sprint Three, I, as Scrummaster Servant Leader cleaned and resealed all of the tile. Finally, the entire team showed up late Friday afternoon and stormed completion of the MVP in one final push. They operationalized the vanity, toilet, and shower, they completed the new suspended glass shower door (which was like a thousand-piece puzzle), and of course, they also completed installation of the elaborate stainless-steel shower panel. I paid the Development Team for their services, gave them a performance bonus, and thanked them for their hard work, dedication, high-quality work, and overall sportsmanship! They only charged 20% of the going rate for the MVP, so maybe they underestimated the labor commitment required for such a project? They were new to the personal home improvement business, as their full-time day jobs involved large industrial building construction projects. They were also not experienced in small, finely granular and meticulous home improvement projects like completing a master bathroom renovation MVP. Their day jobs might involve installing 25 basic toilets or showers in a new condominium building rather than meticulously detailed ornamental master bathrooms. However, they took on this project as a special challenge in venturing out into private home improvement projects for extra income in their spare time. Furthermore, they took this project as a learning Feature Enabler to develop the skills in these types of projects. As Scrummaster Servant Leader, I still had some finishing touches to complete. I had to shop for, buy, and install a shower caddy, and install vanity handles, dispensers, towel racks, outlet plates, and other minor finishing touches. I had to clean up the master bedroom and perform final user acceptance testing. I facilitated the last and final Sprint Three Demonstration or Review with the Chief Business Owner (who accepted all User Stories as well as the MVP). I also facilitated the Sprint Three Retrospective, which consisted of identifying the necessity to use Agile collaborative contracting principles to equally share or split the responsibility of the workload between buyers and suppliers to ensure a favorable outcome. Intense customer involvement has been known to be a determinant of project success for decades. As Business Owners, we were simply glad the project was complete, the MVP was a success, it exceeded our expectations, and it was done cost effectively. We were a little perturbed that it took twice as long as necessary, but this was because it was a scope vs. time-driven MVP. That is, there were immutable Features, User Stories, and Tasks that needed to be complete (and there was even some scope creep in terms of the toilet, light fixtures, medicine cabinet removal, shower panel complexity, and shower door complexity). In other words, a true MVP should have a fixed time period of performance, but flexible scope. However, our MVP had a fixed scope and flexible time. There was also some misunderstanding about the time period of performance as the buyers errantly converted an engineering estimate (with known uncertainty) into a hard commitment. These uncertainties are why there should be strict Work in Process (WIP) limits, excess capacity, and fewer requirements. The guests never saw the MVP, but the Business Owners were delighted for years.

- **Wed** - (No work).

- **Thu** - (No Work, Me) Cleaned & sealed all tile.
- **Fri** - Installed faucets, hookups, toilet, shower hooks, backsplash.
- **Sat** - (End of Work) Installed shower door, vanity drains, shower panel, mirror, and joint compound (over old medicine cabinet).
- **Sun** - (Me) Installed shower caddy (pole).
- **Mon** - (Me) Installed vanity handles, TP dispenser, towel rack, outlet plate, cleaned master bedroom (+books).
- **Tue** - (Me) Installed (remaining) outlet plate.

Analysis and Lessons Learned

Much of the analysis is contained in the body of this mini case study on the (inadvertent) application of Agile Scrum contracting principles to a home improvement project (i.e., master bathroom renovation). As buyers and homeowners, we had a long list of home improvement projects in our pipeline. That is, projects that can never be realized due to extreme funding constraints. Over the last 15 years, we've replaced a roof, siding, floors, sliding doors, furniture, appliances, and automobiles. We've even been blessed to have sent two children to private schools and public colleges at our expense, renovated our kitchen, which was no easy feat, and finished part of our basement by ourselves. However, for every capital improvement we've made, there are two three home improvement projects that will never be funded in our lifetimes. Our Chief Business Owner felt compelled to move the master bathroom renovation to the top of the priority list and roadmap, find suppliers, fund it, resource it, and commit to starting and completing it. Perhaps our mistake was underestimating its cost and complexity. That is, we sought a supplier and a bid due to the pressure of completing this MVP ahead of our Summer guests, found a novice supplier who underbid the project and was willing to begin in the near term and on our timeline, and, quite frankly, underestimated the personal risk involved. The supplier was at fault too, for underestimating the cost, labor, and timelines necessary to complete the project for a handsome profit. Just as high-cost may be a proxy for complexity, risk, uncertainty, and project failure, low-cost may also be a proxy for hidden complexity, risk, uncertainty, and project failure. However, there were at least two or three major elements that swung this home improvement project in our favor. That is, our motivation to get it done, the motivation of the supplier to get it done, the relatively low technical complexity of the project, and, of course, the Agile contracting principles employed by the buyer, some of which include:

- Upfront discovery and scoping activity with the supplier in-advance.
- Low-risk, tightly-scoped Minimum Viable Product (MVP) with low complexity.
- Extended upfront Sprint Zero to acquire all of the necessary supplies in advance.
- Allowing the supplier to choose the start and end dates and times (within our window of opportunity).
- Constant, rich high-context communication, collaboration, presence, and participation with the supplier.
- Full-time commitment to facilitation, oversight, management, coordination, and completion of the project.
- Real-time Agile Scrummastering to identify and remove emerging impediments to optimize velocity and flow.
- Embodiment of Servant Leadership skills to take ownership for personally completing indirect and direct tasks.
- Dependency management, coordination, and communication for proper sequencing of Features, User Stories, and Tasks.
- Going the extra mile to lend a helping hand, solve problems, and provide all of the resources necessary to complete project.
- Continuous improvement to identify emerging patterns, establish mitigation plans, and implement actions to ensure success.
- The coaching of buyer and supplier resources to engage everyone in equal decision-making rights, risk sharing, and workload.

Summary

As we've explained, in the early Summer of 2017 several friends and family members indicated they would be visiting us later that Summer. We decided to renovate our master bathroom along with our kitchen. After some initial discovery, we engaged the services of a supplier who was willing to renovate our bathroom at a reasonable price and timeline. Although the technical complexity and risk of this MVP was relatively low, both the buyer and supplier underestimated the labor cost and time commitment necessary to complete this fixed-scope MVP. Because of his background in both traditional project management and Lean-Agile thinking, one of the Business Owners was thrust into the role of Scrummaster to facilitate completion of this MVP (if for no other reason than proximity to, and personal stake in the completion of the construction project). The Scrummaster intuitively used Agile contracting, collaboration, and facilitation principles and practices to shepherd this MVP on to successful completion. Oftentimes, the Scrummaster had to take on the role of hard-nurturer, commitment seeker, communicator, and development team member in order to complete the MVP. More importantly, the Scrummaster had to proactively identify emerging impediments in real-time, preempt their intrusion by mitigating them, and coach and nudge the team to continue working at maximum velocity while impediments were being mitigated. While the latter, highly-visible User Stories were perceived to have greater Business Value, it was the earlier, hidden Architectural Runway Enabler User Stories that proved to have the greater Business Value, which laid the foundation for the later, more visible User Stories. Last, but not least, this MVP could not have been a success without the participation of unusually talented and highly-motivated suppliers, Development Team members, and buyers or Business Owners. "It takes a village to complete an MVP," which embodies the principles of Lean-Agile thinking as well as Agile collaborative contracting. Finally, if this small, inexpensive, and low-risk MVP was challenging for this small, highly-motivated cross-functional team, I wonder what a system of systems consisting of dozens if not hundreds of MVPs would take to complete successfully. As another old saying goes, "All the king's horses and all the king's men couldn't put Humpty Dumpty together again!"

Further Resources

Rico, D. F. (2018). *Lean & agile contracts*: *21 principles of collaborative contracts and relationships*. Retrieved June 29, 2018, from http://davidfrico.com/collaborative-contract-principles.pdf